USE OF THE AMBR 250 TO ENABLE RAPID CLONE SELECTION AND PROCESS DEVELOPMENT FOR LARGE SCALE MANUFACTURING PROCESSES

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A major challenge in today’s competitive landscape of biotechnology development is to discover and develop new drugs more rapidly; increasing the opportunities to discover new therapies successful in the treatment of unmet needs for patients. Currently, widely used bench scale bioreactor systems require much user manipulation, a large amount of raw materials, and have a long turnaround time for reactor cleaning and rebuilding. New technologies such as robotic disposable bioreactor systems pose a solution to the industry’s high throughput need. The Ambr® 250 offers such a solution, with 24x250mL bioreactors controlled independently. Although this new technology is rapidly being adopted by several groups as a way to increase efficiency and speed within upstream development, little data has been collected characterizing these bioreactors as scale-down systems of larger vessels used in manufacturing suites.

The aim of this work is to characterize the engineering environment of the Ambr® 250 with a view of defining its role in industrial cell culture process development and scale-up. CFD modeling of the Ambr 250 mammalian vessel with validation via Particle Image Velocimetry (PIV) was conducted to simulate the hydrodynamic environment in the vessel. These findings were evaluated against current benchtop models and manufacturing scales. Cultures were run utilizing different engineering parameters (vvm, P/V, k_La) to assess the scalability of the current system. Cell growth, production, and product quality were compared across to recommend operating conditions for the Ambr® 250 that best match manufacturing scale reactors. Multiple CHO host cell lines were examined in order to find optimal operating conditions for the Ambr® 250 system.